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### Establishment of Silicon Carbide (SiC) Wafer Polishing Mass-Production Technology

SEIKOH GIKEN Co., Ltd. has applied its precision polishing technology to develop high-speed, high-accuracy polishing technology for SiC wafers, which have attracted considerable attention as next-generation semiconductor substrate material.

#### SiC wafers

SiC withstands higher voltages, is more resilient to high temperatures, and suffers less electric power loss than the currently predominant silicon (Si) substrate material. It is highly expected that SiC will be used in voltage/current control devices, such as in power generation, power transmission, and other electric power equipment; power supply for communications systems and factories; and drive units for trains and automobiles among other applications. However, because SiC is harder than Si, it is more difficult to polish, and developing mass-production technology has been a major issue standing in the way of its widespread use as semiconductor substrate.

#### Establishment of SiC wafer polishing mass-production technology

SEIKOH GIKEN Co., Ltd. has integrated its precision polishing technology with technology disclosed by the National Institute of Advanced Industrial Science and Technology (AIST) to successfully develop SiC wafer polishing mass-production technology that brings out all of the properties of single-crystal SiC. A key feature of the new technology is the elimination of excessive polishing force to the SiC crystal, which greatly reduces processing distortion and thus improves wafer surface accuracy. The surface roughness has an Ra value of 0.1 nm or less, which is far better than the Ra value of 0.3 nm or less required for epitaxial film growth. At the same time, increased mass-production efficiency was achieved by reducing the polishing time to establish technology that brings SiC to the practical level where its expectations as the next-generation semiconductor substrate material can be realized.

This polishing technology can also be applied to the processing of sapphire, gallium nitride (GaN), and zinc oxide (ZnO) crystals used as substrate material for white LEDs, which have rapidly gained market acceptance ahead of SiC.

#### Manufacturing and sales prospects

In July of this year, SEIKOH GIKEN began shipping samples of SiC substrates polished using this new technology to research organizations and device manufacturers. The structure for producing small lots has already been established at the company's headquarters plant in Matsudo City, Chiba Prefecture, paving the way for future mass production.

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